

Biospheric Sciences Branch Highlights
Code 614.4
September - October 2006

- **SCIENCE POLICY MEETINGS, SCIENCE TEAM MEETINGS, WORKSHOPS**

- ** **NASA Land-Cover and Land-Use Change Science Team Meeting at UMCP**

The LDCM Project Scientist, Jim Irons, Code 614.4, presented the status of the LDCM on Oct. 10 at the NASA Land-Cover and Land-Use Change Science Team Meeting , UMUC Inn and Conference Center. The LDCM HQ Program Executive, Ed Grigsby, gave a briefing on the Landsat Data Gap Study Team and Steve Covington, Aerospace Corporation support in USGS, gave a presentation on the Mid-Decadal Global Data Set effort at that same meeting.

- ** **Carbon Cycle & Ecosystem Office hosts the 10th meeting of the LBA ECO Science Team**

The Carbon Cycle & Ecosystem Office at GSFC hosted the 10th meeting of the LBA-ECO Science Team, held this year in Brasília, Brazil. More than 130 scientists from the US and Brazil attended to present the current state of synthesis and integration research relevant to phase 3 of LBA-ECO. The complete agenda and proceedings are available online at: http://www.lbaeco.org/cgi-bin/eco10/eco10_ab_agenda_of_abstracts.pl

- **FUNDED RESEARCH**

- ** **Dr. Bounoua's published research results featured by NASA's Public Affairs Office**

In combined studies with colleagues at University of Maryland, Dr. Bounoua published results from his research work that was featured by NASA's Public Affairs Office. Using NASA's satellite data, the study found that recent clearing for mechanized agriculture has become a significant force in Brazilian Amazon deforestation. This change in land use may alter the region's climate and the land's ability to absorb carbon dioxide. The first study published in the September edition of the Proceedings of the National Academy of Sciences, examined cropland expansion in Mato Grosso (Brazil), the state with the highest deforestation rate and soybean production since 2001. Using a computer climate model driven by MODIS data, the researchers examined the sensitivities of climate to recent changes in Mato Grosso. These results will appear in Earth Interactions. These findings suggest that recent land conversions of the Amazon forest may have measurable effects on the regional climate.

The NASA web story "Growth in Amazon Cropland May Impact Climate and Deforestation Patterns" may be accessed on the following:

PORTAL:

http://www.nasa.gov/vision/earth/environment/amazon_crops.html

FEATURE:

http://www.nasa.gov/centers/goddard/news/topstory/2006/amazon_crops.html

**** Dr. Nelson works with Norwegians on two separate projects--use of airborne LiDAR data to measure forests, and tree size necessary for detection by air-borne lasers**

Ross Nelson traveled to Norway twice this past summer to work with Professor Erik Næsset and Prof. Terje Gobakken of the Norwegian University of Life Science in Ås, Norway. Two joint research projects are on-going, both involve the use of airborne LiDAR data to measure forests. Nelson traveled to Hedmark County, Norway June 12 - July 8 to collect PALS (Portable Airborne Laser System, a NASA profiling LiDAR) data along ~9,000 km of flight transects over Hedmark County in southeastern Norway. One hundred five parallel flight lines spaced 3 km apart were flown over mountainous/glacial valley terrain; approximately 80 hours were spent in the air. These data will be used to estimate the forest resources of Hedmark County, a ~27,000 sq.km. area about the size of Massachusetts. Profiling LiDAR and scanning LiDAR estimates will be compared with Norwegian Forest Inventory ground-based estimates. The study will further develop LiDAR-based sampling procedures for large-area mensuration and monitoring.

Nelson took a second trip August 19 - September 2 to collect field measurements associated with a "small tree" study in south central Norway. This study is independent of the Hedmark study described above. This small tree study aims to answer the question - "At tree line in Norway, how large/tall does a tree have to be in order to be reliably discriminated in airborne laser scanning data with a shot density of 5-8 pulses/m²". As the climate warms, we expect trees to move up slope, and we would like to know the limitations of scanning LiDAR for detecting such movement. The flight time and travel costs were paid for by the Norwegian Research Council.

**** Dr. Brown de Colstoun leads Biospheric Sciences Team in organizing educational satellite validation field campaign**

Eric Brown de Colstoun, Anita Davis, Julia Barsi (SSAI/Code 614.4) and Jessica Robin (GLOBE/SSAI/Code 614.4) recently organized an educational satellite validation field campaign entitled "Bridging the GAPS from Space: How to validate NASA Satellite Data in the Field" at the Pocono Environmental Education Center (PEEC) in

Dingmans Ferry, PA, on the grounds of the Delaware Water Gap National Recreation Area (DEWA). The campaign was jointly sponsored by the Landsat Education and Public Outreach program, the National Park Service, the GLOBE program and the Northeastern and Colonial Intermediate Units from the State of PA, and brought together over 130 participants including middle and high school science/math/geography teachers and their students from 9 local school districts, staff from two national parks and the NPS Inventory and Program, as well as NOAA. Attendees also included the Park Superintendent and Chief of Natural Resources Division of DEWA, undergraduate students from the University of Maryland and Lackawanna College, 4 TV stations and multiple members of the media who interviewed organizers/trainers/participants.

The objectives of the campaign were to teach the teachers and students how to validate in the field Landsat-based % tree cover and impervious cover data sets for the Upper Delaware River Basin, being developed through Eric's NASA-funded New Investigator Program project. Limited data collection of biometric information to support ICESAT land data utilization was also performed at selected sites. Participants were trained in the GLOBE, GPS, biometry (%tree cover, height) and land cover (land cover type, tree species) field measurements protocols, given a brief presentation on the research component of the project, and then were sent out into the DEWA park to their assigned sites to make the field measurements. Participants also jointly measured two principal sites at PEEC to assess the variability of their canopy cover and tree height measurements. This research/educational partnership between the Principal Investigator, the NPS, the PA Intermediate Units and area students and educators is one that clearly benefits the development and validation of the proposed research but also provides the compelling story line for a wide variety of educational activities using NASA data, all within the spectacular setting of our National Parks.

**** Dr. Lyapustin's accepted and published papers** (Code 614.4 personnel in bold)

A. Lyapustin, Y. Wang, R. Kahn, **J. Xiong**, A. Ignatov, R. Wolfe, A. Wu, and C. Bruegge, "Analysis of calibration difference between MODIS and MISR", Proceedings of SPIE - Remote Sensing and Modeling of Ecosystems for Sustainability III, Vol. 6298, 62980X (Sep. 27, 2006) - doi: 10.1117/12.680896.

X.-M. Hua, J. Pan, D. Ouzounov, **A. Lyapustin, Y. Wang**, K. Tewar, G. Leptoukh, B. Vollmer, "A Spatial Pre-Screening Technique for Earth Observation Data", EEE Geoscience and Remote Sensing Letters, accepted 2006.

Lyapustin, Y. Wang, R. Kahn, **J. Xiong**, A. Ignatov, R. Wolfe, A. Wu, **B. Holben**, C. Bruegge, "Analysis of MODIS-MISR calibration differences using surface albedo around AERONET sites and cloud reflectance," accepted for publication in the MISR Special Issue of Remote Sensing of Environment.

- **SIGNIFICANT ACTIVITIES**

- ** Dr. Middleton invited to serve as independent observer with ESA's Fluorescence Explorer (FLEX) Mission**

The Recent Advances in Quantitative Remote Sensing II (RAQRSII) Symposium 2006, an international conference limited to 300 participants organized by the Global Change Unit of the University of Valencia, was held in the Torrent Auditorium near Valencia, Spain on Sept 25-29. Dr. Betsy Middleton presented a paper evaluating simulations of a linked leaf/canopy/chlorophyll fluorescence radiative transfer model (referred to as FluorMOD, sponsored by the European Space Agency (ESA)) against field and laboratory measurements of corn crops obtained in a joint NASA/USDA project. Since the presented results are pertinent to ESA's Fluorescence Explorer (FLEX) Mission Dr. Middleton has been invited to serve as an Independent Observer with the FLEX Advisory Group, which will require NASA approval. FLEX is currently one of six finalist concepts in the ESA pre-Phase A competition. In addition, several collaborations with European scientists on fluorescence and spectral studies of vegetation physiological stress were initiated.